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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Claude Couture, *et al.*
Serial No. : 10/044,846
Filed : 11/09/2001
Group Art Unit : 1711
Examiner : Tran, Thao T.
Title : **CROSSLINKED POLYSACCHARIDE,
OBTAINED BY CROSSLINKING WITH
SUBSTITUTED POLYETHYLENE
GLYCOL, AS SUPERABSORBENT**
Confirmation No. : 7917
Last Office Action : July 15, 2005
Attorney Docket No. : CLWZ 2 00148

REPLY BRIEF UNDER 37 C.F.R. § 41.41

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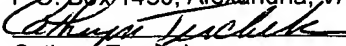
Dear Sir:


This Reply Brief is in furtherance of the Examiner's Answer dated February 22, 2006, and the Appeal Brief mailed to the U.S. Patent and Trademark Office on January 06, 2006.

Appellant files herewith a Reply Brief in connection with the above-identified application wherein claims 4-9 and 66-82 were finally rejected in the Final Office Action of June 13, 2005.

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Cathryn Terchek

Date:  April 24 2006

EXAMINER INTERVIEW

On April 4, 2006, representatives of the Appellant, including the undersigned, conducted a telephonic interview with the Examiner. An attempt was made to discuss the issues raised by the Examiner in her Answer to the Appellant's Reply Brief. Specifically, Appellant wanted to discuss the limitation regarding the backbone chain of the polysaccharide in an effort to advance/expedite prosecution. The Examiner indicated that she believed the issues had been fully discussed in previous interviews and that the Appellant's proper recourse was to file a Reply Brief addressing any concerns. Accordingly, these issues have been highlighted below, and this Reply Brief will also serve as a statement of the substance of that interview.

ARGUMENTS

Claims 4-6 and 66-82 have been rejected as being anticipated by Qin *et al.* (US Pat. 5,550,189) under 35 U.S.C. § 102(b). Appellants respectfully traverse the rejection as follows.

The Examiner's Answer mailed on February 22, 2006, did not take into consideration crucial arguments submitted by the Appellant.

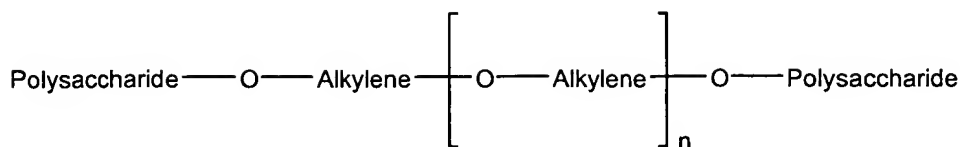
I. Backbone Interpretation

This argument, among others, was presented by the Appellant in the APPEAL BRIEF mailed on January 06, 2006; in the "RESPONSE/REQUEST FOR RECONSIDERATION" mailed on June 21, 2005; in the TELEPHONIC INTERVIEW held June 17, 2005 and in the "RESPONSE/REQUEST FOR RECONSIDERATION" mailed March 18, 2005.

The "BACKBONE INTERPRETATION" argument should be addressed and construed separately from the "ESTER/ETHER" argument. Both arguments are distinct since both address separate parts of claim 4. More specifically, the "BACKBONE INTERPRETATION" argument is based on:

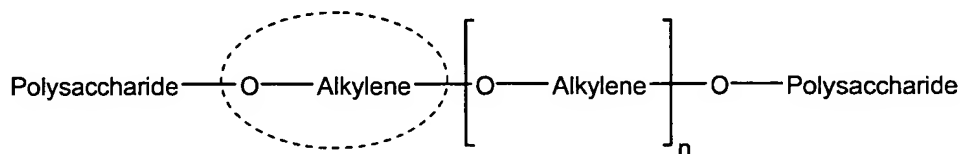
- The phraseology "wherein each Alkylene";
- The phraseology "wherein n is an integer ranging from 1 to 100"; and

- formula 2.



Formula 2

Formula 2 should be construed as comprising a **poly**alkylene glycol backbone, not an alkylene glycol backbone. Indeed, as shown in formula 2, there is a static O-alkylene group, illustrated hereinbelow by a circled dashed line:



Formula 2

Chemically linked to the static O-alkylene group is a repeating number of O-alkylenes, (inside the square brackets). These O-alkylene units are repeated "n" times. Since "n" is an integer ranging from 1 to 100, there is at least one (1) O-alkylene unit inside the brackets. Summing-up both the static part and the repeating part, there are always present in the backbone at least two (2) O-alkylene units:

$$1 \text{ STATIC O-alkylene} + 1 \text{ REPEATING O-alkylene} = 2 \text{ O-alkylenes}$$

Thus, if n=1, the polysaccharides are cross-linked by a **di**alkylene glycol backbone. A non-limiting example of such a **di**alkylene glycol is diethylene glycol. If n=2, the polysaccharides are cross-linked together by a **tri**alkylene glycol backbone. A non-limiting example of such a **tri**alkylene glycol is triethylene glycol. If n=7, the polysaccharides are cross-linked together by an **oct**alkylene glycol backbone. A non-limiting example of such an **oct**alkylene glycol is octethylene glycol.

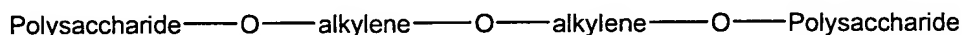
The multiple nature of the O-alkylene unit should be even more obvious, considering that claim 4 comprises the wording "wherein each Alkylene". According to Webster's II College Dictionary 1999, "each" is defined as:

"being one of two or more regarded individually".

It is thus respectfully submitted that the Board construe the backbone as defined in claim 4 as comprising two or more O-alkylene units.

II. Backbone Interpretation vs. Qin et al. (US Pat. 5,550,189)

Appellant respectfully disagrees with the Examiner's allegation that *"the product of Qin would at least read [on] the presently claimed structure when, for example, taking n=1."* As construed hereinabove in point I, if n=1, the backbone as defined in claim 4 will be:



The cited reference (Qin, US Pat. 5,550,189) relates to ethylene or butylene glycol cross-linked polysaccharides. Such cross-linked polysaccharides inherently are of structure:



In view of the above, the Examiner should clearly appreciate the crucial differences between the Qin backbone and the backbone as claimed in the Appellant's presently pending application. Qin teaches a *monomer* cross-linked backbone whereas the present application teaches a *polymer* cross-linked backbone. It is well known in the art that polymers and monomers have different characteristics. Appellant surprisingly discovered that polyalkylene glycol backbone cross-linked polysaccharides exhibit very high absorbent characteristics.

III. Cross-Linking agent used

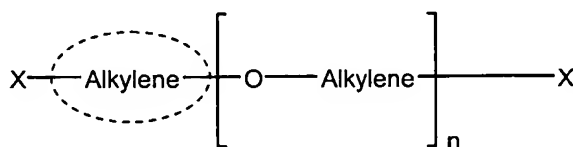
Appellant respectfully disagrees with the Examiner's allegation that *"... Qin also discloses the same polysaccharide i.e. carboxymethyl starch, and the same crosslinking agent, i.e. ethylene glycol..."*. The Examiner should

appreciate two (2) crucial differences between the cross-linking agent as thought by Qin and the cross-linking agent as taught in Appellant's presently pending application. These two (2) differences, addressed and construed separately hereinbelow, are:

- Activation by means of a pair of leaving groups X;
- Polymeric cross-linking agent.

i. Polymeric Cross-linking agent

The cross-linking agents of the presently pending applications are defined in claim 74 and are represented hereinbelow by Formula 2A.



Formula 2A

Moreover, the Examiner is directed to the similarities in the wording of claims 4 and 74. More specifically, claim 74 comprises the phraseology:

- “wherein each alkylene”; and
- “wherein n is an integer ranging from 1 to 100”.

As previously discussed in point I, and as can be clearly observed in Formula 2A, the cross-linking agents as defined in presently pending claim 74 (*i.e.* activated polyalkylene glycol) comprise a static alkylene unit (illustrated hereinabove by a circled dashed line). Moreover, the cross-linking agents as defined in presently pending claim 74 also comprise a repeating number of O-alkylenes (inside the square brackets). These O-alkylene units are repeated “n” times. Since “n” is an integer ranging from 1 to 100, there is at least one (1) O-alkylene unit inside the brackets. Summing-up both the static part and the repeating part, there are always present in the cross-linking agent, at least two (2) distinct alkylene units.

Thus, if $n=1$, the cross-linking agent is a bi-activated dialkylene glycol. A non-limiting example of such a bi-activated dialkylene glycol is 1,5-dichloro-3-oxopentane. If $n=2$, the cross-linking agent is a bi-activated trialkylene glycol. A

non-limiting example of such a bi-activated trialkylene glycol is 1,8-dichloro-3,6-dioxooctane.

The multiple nature of the O-alkylene unit should be even more obvious, considering that claim 74 comprises the wording "wherein each Alkylene". According to Webster's II College Dictionary 1999, "each" is defined as:

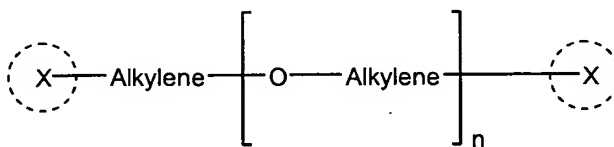
"being one of two or more regarded individually".

It is thus respectfully submitted that the Board construe the cross-linking agent as defined in claim 74 (*i.e.* activated polyalkylene glycol) as comprising two or more O-alkylene units. Contrary to the cross-linking agents of the presently pending application, the cross-linking agents as thought by Qin, (*i.e.* ethylene glycol or butylene glycol), do not comprise two (2) or more O-alkylene units.

ii. Activation by Means of a Pair of Leaving Groups X

A further distinctive feature of the cross-linking agents as defined in claim 74 of the presently pending application is the presence of a pair of leaving groups X (Figure 2A). More specifically, the Board is directed to the phraseology:

- "wherein X is selected from the group consisting of halogen, mesylate, tosylate and triflate."



Formula 2A

The leaving groups X are subject to nucleophilic substitution (SN2). Under alkaline pH, the hydroxyl functions of polysaccharides will generate alkoxy (*i.e.* RO⁻) groups. These RO⁻ groups will react with the electropositive alkylene carbons bearing the leaving groups X, yielding the molecular backbone as claimed in presently pending claim 4.

Contrary to the Examiner's allegations, and contrary to the cross-linking agents as taught in the presently pending application, the cross-linking agents as

taught by Qin (*i.e.* ethylene glycol or butylene glycol) do not comprise any leaving groups subject to nucleophilic substitution. Moreover, Qin is silent with respect to any one of the leaving groups (*i.e.* halogen, mesylate, tosylate and triflate) as taught by the presently pending application.

IV. Summary

In the present Reply Brief, Appellant has once again underscored critical novelty imparting features not previously considered by the Examiner. For the Board's convenience, the Appellant has carefully construed claims 4 and 74 to illustrate these differences. Appellant, by the present Reply Brief, submits that the backbone chain of atoms as defined in presently pending claim 4 will inevitably and always comprise at least two (2) distinct O-Alkylene units. This argument is rendered even more obvious considering the term "each" as used by the Appellant in presently pending claims 4 and 74. Appellant again submits that **the teachings by Qin are silent with respect to multiple O-Alkylene groups.**

Moreover, Appellant again submits that the cross-linking agents used to manufacture the cross-linked polysaccharide as defined in presently pending claims 4 and 74, are neither disclosed nor hinted at by the teachings of Qin. Appellant, by the present Reply Brief, submits that the use of the cross-linking agents as defined in presently pending claim 74 will inevitably and always provide a cross-linked polysaccharide having a backbone chain of atoms comprising at least two (2) distinct O-Alkylene units. This argument is rendered even more obvious considering the term "each" as used by the Appellant in presently pending claims 4 and 74. Appellant again submits that **the teachings by Qin are silent with respect to multiple O-Alkylene groups.**

Finally, Appellant again emphasizes that the cross-linking agents used to manufacture the cross-linked polysaccharide as defined in presently pending claims 4 and 74, comprise a pair of leaving groups X. These leaving groups are subject to nucleophilic substitution (SN2) and are selected from the group consisting of halogen, mesylate, tosylate and triflate. Appellant again submits that **the**

teachings by Qin are silent with respect to the presence of leaving groups on the cross-linking agents that are subject to nucleophilic substitution.

CONCLUSION

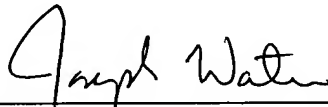
In view of the above, Appellant respectfully submits that claims 4-9 and 66-82 are not anticipated or rendered obvious by the cited art.

Accordingly, it is respectfully requested that the Examiner's rejections be reversed.

Respectfully submitted,

FAY, SHARPE, FAGAN
MINNICH & McKEE, LLP

Dated: April 21, 2006



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